

**Utah Department of Transportation**



**Supplemental Specifications  
for**

**2005 Standard  
Specifications**

**FOR ROAD AND BRIDGE  
CONSTRUCTION**

**U.S. Standard Units (Inch-Pound Units)**

**Issued September 12, 2005**

# Memorandum

UTAH DEPARTMENT OF TRANSPORTATION

**DATE:** September 12, 2005

**TO:** Holders of Hard Copy of Standard Specifications

**FROM:** Barry Axelrod, CDT  
Standards and Specifications

**SUBJECT:** Supplemental Specifications Distribution, dated September 12, 2005

Applicable files for the change are attached. Maintain these files as a supplemental update to the UDOT Standard Specifications dated January 1, 2005. No pages are to be removed or replaced in the basic book, electronic or hard copy.

If you are in need of electronic copies of any Standard or Supplemental Specification please refer to the Standards and Specifications Web site at <http://www.udot.utah.gov/index.php?m=c&tid=302>. From there select the **2005 Standards** subtopic.

If you have any questions or problems with the electronic files contact me at 801-964-4570 or by email at [baxelrod@utah.gov](mailto:baxelrod@utah.gov).

Attachments

## **Listing of Supplemental Specifications**

### **Issue Date: March 14, 2005**

Revised February 24, 2005

Section 01282M Article 1.1 Paragraph D added and Article 1.14 Paragraph E replaced.

Section 01284 New section added

Section 02785M Replaces Table 1 to correct reference callout from AASHTO to ASTM

Section 02843 Entire section revised.

Section 06055M Article 1.2 Paragraph F added and Article 2.2 Paragraphs A and D modified.

### **Issue Date: May 10, 2005**

Revised April 28, 2005

Section 02827 New section added

### **Issue Date: July 12, 2005**

Revised June 30, 2005

Section 02745 Entire section revised.

Section 03412M Article 1.3 revised, Article 1.4 Paragraph E added, Article 1.5 Paragraph C added, and Article 3.7 added.

Section 05120 M Article 1.3 revised, Article 1.4 Paragraph D added, and Article 3.5 added.

### **Issue Date: September 12, 2005**

Revised August 25, 2005

Section 01452M Article 3.1 Paragraph B item 1 replaced.

Section 01571 Entire section replaced.

Section 01574M Article 1.1 replaced, Article 1.3 Paragraph B added, and Article 3.1 Paragraphs F and G added.

Section 01721M Article 1.2 replaced.

Section 02842M Article 1.3 Paragraph C and Article 2.1 Paragraph A replaced.

Section 13551M Article 1.3 replaced, Article 2.1 replaced, Article 3.3 Paragraph C replaced, Article 3.5 Paragraph C replaced, and Article 3.5 Paragraph D added.

Section 13552M Article 1.1 Paragraph A replaced, Article 1.3 replaced, Article 2.2 through Article 2.6 replaced, Article 2.8, Paragraph C added, and Article 3.2 replaced.

Section 13553M Article 1.2 paragraphs I and J replaced, Article 1.3 replaced, Article 2.1 Paragraphs H and I replaced, Article 3.1 Paragraph F replaced, Article 3.1 Paragraph Q3 replaced, Article 3.2 Paragraph A replaced, Article 3.3 Paragraph F replaced, Article 3.4 Paragraph C added, and Article 3.5 Paragraph C added.

Section 13554M Article 2.2 replaced and Article 3.1 Paragraph N through H replaced.

Section 13555M Article 1.3 Paragraph E added, Article 2.1 Paragraph A replaced, Article 3.1 Paragraph D deleted, Article 3.2 Paragraphs C, G, and H replaced, Article 3.4 replaced, and Article 3.6 Paragraphs A and B replaced.

Section 13556 Entire section revised.

Section 13561M Article 2.1 Paragraph K added, Articles 3.1 Paragraphs E through G replaced, and Article 3.2 Paragraph A replaced.

Section 13594M Article 2.3 Paragraph A replaced, Article 2.3 Paragraph C replaced, Article 2.4 replaced.

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**SECTION 01452M**

**PROFILOGRAPH AND PAVEMENT SMOOTHNESS**

**Delete Article 3.1, paragraph B1 and replace with the following:**

1. Incentive/Disincentive applies only to Class I surfaces for each pavement section defined in this Section, Article 1.5, paragraph B.
  - a. Incentive/Disincentive is calculated according to Table 2, with partial sections prorated based on length.
  - b. Incentive/Disincentive does not apply to HMA surfaces on projects requiring OGSC or SMA.
  - c. Any section requiring grinding exceeding 20 yd<sup>2</sup> does not qualify for incentive. Disincentive remains applicable for sections where grinding exceeds 20 yd<sup>2</sup>.

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**SECTION 01571**

**TEMPORARY ENVIRONMENTAL CONTROLS**

**Delete Section 01571 and replace with the following:**

**PART 1      GENERAL**

**1.1      SECTION INCLUDES**

- A.      Requirements for controlling erosion on the construction site and diminish the amount of sediment leaving the site, and related areas under the Contractor's control.
- B.      Requirements for installing, maintaining, and removing temporary erosion control measures.

**1.2      RELATED SECTIONS**

- A.      Section 01574: Environmental Control Supervisor
- B.      Section 02373: Riprap
- C.      Section 02610: Pipe Culverts
- D.      Section 02613: Culvert End Sections
- E.      Section 02922: Seed, Turf Seed, and Turf Sod

**1.3      REFERENCES**

- A.      AASHTO M 288: Geotextile Specifications for Highway Applications.
- B.      Storm Water Pollution Prevention Plan (SWPPP)

## 1.4 TYPES

Refer to EN series Standard Drawings for all types.

- A. Check Dam:
  - 1. A temporary fiber roll or stone structure that is placed across a ditch to intercept and pond sediment-laden runoff, thereby reducing the water velocity and allowing suspended sediment to settle. Constructed so water will flow over a low point in the middle of the dam and not around the sides.
- B. Silt Fence:
  - 1. A geotextile fabric fence installed to intercept and pond sediment-laden sheet flow runoff allowing suspended sediment to settle.
- C. Slope Drain:
  - 1. A polyethylene pipe placed on a slope that collects and transports storm runoff down the face of a slope and is used until permanent drainage facilities are installed or vegetation growth is adequate.
- D. Temporary Berm:
  - 1. A ridge of compacted soil, with or without a shallow ditch that diverts storm runoff from a recently constructed slope to a controlled release point.
- E. Drop-Inlet Barrier:
  - 1. A fiber roll, silt fence, or stone barrier placed around a drop-inlet that intercepts and ponds sediment-laden runoff allowing suspended sediment to settle. If the pond height reaches the top of the barrier, water flows over the barrier and into the drop-inlet.
- F. Pipe Inlet Barrier:
  - 1. Consists of a horseshoe-shaped barrier protecting a pipe inlet that intercepts and ponds sediment-laden runoff before it enters a pipe allowing suspended sediment to settle.
- G. Curb Inlet Barrier:
  - 1. A protective barrier placed across a curb inlet that intercepts and ponds sediment-laden runoff before it enters a curb inlet.
- H. Sediment Trap:
  - 1. An excavated basin, usually installed at low points on a construction site, that intercepts and ponds sediment-laden concentrated flows allowing suspended sediment to settle.

- I. Stabilized Construction Entrance:
  - 1. A layer of rock placed at a construction site entrance that removes mud from vehicle tires before they leave the construction site and drive onto a paved road.
- J. Straw Bale Barrier:
  - 1. Consists of straw bales butted end to end and used in active construction areas where a silt fence would fail. Installed to intercept and pond sediment-laden sheet flow runoff allowing suspended sediment to settle.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. Check dams:
  - 1. Fiber Roll:
    - a. Fiber Roll: Contact Engineer for Approved Products List of Fiber Roll Products. Approved list is updated annually.
    - b. Wood stakes: commercial quality lumber 2-inch square (nominal) by 3 feet.
    - c. Channel Liner: Contact Engineer for Approved Products List of Channel Liners. Approved list is updated annually.
  - 2. Stone: Well-graded within 2 to 6 inches in diameter.
- B. Silt Fence:
  - 1. Silt Fence Fabric: See AASHTO M 288 (Table 6 – Temporary Silt Fence Property Requirements).
  - 2. Wood Post: commercial quality lumber, 2-inch square (nominal) by 4 feet in length.
  - 3. Fasteners: Staples, wire, zip ties, or nails sufficient to maintain the fabric's attachment to post.
- C. Slope Drain:
  - 1. Pipe Culverts: Refer to Section 02610.
  - 2. End Section: Refer to Section 02613.
  - 3. 9-inch Loose Riprap: Refer to Section 02373.
  - 4. Wooden stakes: commercial quality lumber 2-inch square (nominal) by 3 feet.
- D. Temporary Berm:
  - 1. Existing Soil.



- E. Drop-Inlet Barriers:
  - 1. Fiber Roll: Refer to this Section.
  - 2. Stone: Well-graded within 2 to 6 inches diameter.
  - 3. Silt-Fence: Refer to this Section.
    - a. Wood stud: 2 inches x 4 inches (nominal).
- F. Pipe Inlet Barrier:
  - 1. Stone: Well-graded within 2 to 6 inches in diameter.
- G. Curb Inlet Barrier:
  - 1. Concrete Building Blocks.
  - 2. Stone: Well-graded within 2 to 6 inches diameter
  - 3. Wire Mesh: 0.5 inch by 0.5 inch openings.
  - 4. Wood stud: 2 inches x 4 inches (nominal).
- H. Sediment Trap:
  - 1. 9-inch Loose Riprap: Refer to Section 02373.
- I. Stabilized Construction Entrance:
  - 1. Stone: Well-graded within 2 to 3 inches in diameter.
- J. Straw Bale Barrier:
  - 1. Standard Straw Bales: Obtained from weed free fields that have been certified by the Utah Department of Agriculture.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Follow the Storm Water Pollution Prevention Plan (SWPPP) in the plan set.
  - 1. Address in the SWPPP all disturbed areas on a project including staging areas, haul roads, borrow sites, stockpiles, and disposal areas.
  - 2. If SWPPP is not provided in the plans, create and submit a plan to the Engineer for approval.
  - 3. Obtain written approval from the Engineer to change the SWPPP.
- B. Designate an Environmental Control Supervisor (ECS) who will:
  - 1. Work directly with the Department SWPPP coordinator designated by the Engineer.
  - 2. Be available as needed to coordinate the SWPPP, inspect and maintain sediment control devices, and resolve other issues.

- C. Do not start earth-disturbing work until SWPPP is approved, and appropriate temporary erosion and sediment control measures are in place.
- D. Use the most restrictive requirement if a conflict occurs between erosion and sediment control specifications and federal, state, or local agency's laws, rules, or regulations.

### **3.2 INSTALLATION**

- A. Provide or construct measures such as check dams, silt fence, slope drains, drop-in inlet barriers, sediment traps, and other erosion control devices or methods to reduce erosion and sedimentation during construction or shutdown periods.
- B. Follow installation procedures outlined in the EN Series Standard Drawings.

### **3.3 INSPECTIONS**

- A. Inspect all denuded areas during construction to determine potential erosion problems. Pro-actively apply corrective measures in a timely manner as required.
- B. Inspect all sediment retention structures. Refer to Section 01574.

### **3.4 MAINTENANCE**

- A. Maintain temporary sediment control devices to ensure they function properly until all disturbed areas draining to them are stabilized.
- B. Remove and properly dispose of sediment when it has accumulated half way up the overall structure height or it interferes with the performance of the structure.
- C. Dispose of sediment removed from erosion control structures in a manner acceptable to the Engineer.

### **3.5 REMOVAL**

- A. All costs associated with Removal are incidental to other items of work and no separate measurement or payment will be made.
- B. After all seeding and mulching has been placed and just before final closeout of the project, remove any remaining sediment from behind and around erosion control features and remove all temporary erosion control features unless directed differently by the Engineer.
- C. Seed areas where the sediment was removed following Section 02922.

END OF SECTION

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**SECTION 01574M**

**ENVIRONMENTAL CONTROL SUPERVISOR**

**Delete Article 1.1 and replace with the following:**

**1.1 SECTION INCLUDES**

- A. Description of the responsibilities of the Contractor's Environmental Control Supervisor (ECS) to administer environmental compliance on the project.
- B. When no bid item is included in the proposal for "Environmental Control Supervisor" then this section does not apply.

**Add Article 1.3, paragraph B:**

- B. Utah Storm Water General Permit for Construction Activities

**Add Article 3.1, paragraphs F and G**

- F. Know what is contained in Utah Storm Water General Permit for Construction Activities – Permit No.: UTR100000 and comply with the outlined conditions. Refer to <http://www.udot.utah.gov/index.php/m=c/tid=719>.
- G. When a U.S. Army Corps of Engineers Nationwide or Individual Permit or a Utah Division of Water Rights Regional General Permit 40 is issued on a project, know and follow the General and Special Conditions associated with these permits.

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**SECTION 01721M**

**SURVEY**

**Delete Article 1.2, and replace with the following:**

**1.2 RELATED SECTIONS**

- A. Section 01280: Measurement
- B. Section 02765: Pavement Marking Paint

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**SECTION 02842M**

**DELINEATORS**

**Delete Article 1.3, Paragraph C and replace with the following:**

- C. ASTM A 1011: Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

**Delete Article 2.1, Paragraph A and replace with the following:**

- A. Supply and galvanize posts as specified. ASTM A 1011, and AASHTO M 111.

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**SECTION 13551M**

**GENERAL ATMS REQUIREMENTS**

**Delete Article 1.3 and replace with the following:**

**1.3 REFERENCES**

- A. AASHTO M 232: Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
- B. AASHTO M 314: Standard Specification for Steel Anchor Bolts
- C. AASHTO Roadside Design Guide (current edition)
- D. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (current edition)
- E. ASTM D 3005, Type I or II. UL 510
- F. American Wire Gauge (AWG)
- G. Electronic Industries Association (EIA) and Telecommunications Industry Association (TIA) Specifications
- H. International Municipal Signal Association Regulations
- I. National Electric Code (NEC)
- J. Rural Electrical Association (REA) Bulletins
- K. USDA Rural Utilities Service (RUS) Bulletin
- L. Underwriters Laboratory (UL)

**Delete Article 2.1 and replace with the following:**

## **2.1 DOCUMENTATION**

### **A. Submittals**

1. Provide two copies of all documentation to the engineer. Install one additional copy each field cabinet.
2. The general purpose and content of all required submittals is described in the following table. Refer to the appropriate specifications for the details of the submittal requirements and test procedures for each ATMS device type. Obtain UDOT's newest version of the test procedures for the local field operations test from the UDOT website. Refer to <http://www.udot.utah.gov/index.php/m=c/tid=719>.

Name	Timeline	Description
Contractor Furnished Material and Equipment Lists	Submit within fifteen business days from the Notice to Proceed.	Includes the name of manufacturer, size, and identification number. All contractor furnished equipment must be approved by the Engineer prior to ordering.
Test Reports (for Cable and Conductor test, the Local Field Operations Test, and Acceptance Tests.)	Submit within five business days from the completion of a successful test.	To be provided after the completion of a successful test. Test Reports are required for each appropriate ATMS device installation, including, but not limited to CCTV, VMS, RWIS, WIM, Traffic Monitoring Detector Loops or other specified detection device, and Fiber Optic Communication Systems. Provide Test Reports in a neatly bound (3' hole) and printed format. The Test Reports will include the following: <ol style="list-style-type: none"><li>1) All test results (including failed tests)</li><li>2) Description of any observed discrepancies</li><li>3) Description of required corrective action</li><li>4) Estimated time to complete corrective action and re-test</li><li>5) Results of any corrective action</li></ol>
Completion Notice	Provide to the Engineer after all devices have successfully passed the Local Field Operations Tests, at least 5 business days prior to beginning acceptance tests.	Consists of the certification that all ATMS installations are compliant with all project requirements. Use the Local Field Operations Testing Completion Notification Form obtained from the UDOT website. Refer to <a href="http://www.udot.utah.gov/index.php/m=c/tid=719">http://www.udot.utah.gov/index.php/m=c/tid=719</a> .



Name	Timeline	Description
Compliance Certificate	Submit within five business days of receipt by the Manufacturer for each site.	Provide an installation compliance certification by the manufacturer on required equipment.
Manufacturer's Equipment Documentation	Must be received and accepted prior to Final Acceptance	For all contractor furnished items, provide all factory issued manuals per this section, article 2.1, paragraph B, software, detailed shop drawings, wiring diagrams, certifications, warranties, instruction sheets, and parts lists to the engineer.
As-Built Drawings	Must be received and accepted prior to Final Acceptance	Refer to section 01721

**B. Factory Issued Manuals**

1. Acceptable factory manuals must contain technical, diagnostic, and maintenance (preventative and troubleshooting) information. Advertising brochures and catalog cuts not accepted.

**Delete Article 3.3 paragraph C and replace with the following:**

**C. Field locate equipment with the Engineer.**

1. Avoid areas with poor drainage, and place for minimum impact from thrown snow.
2. Place for maximum accessibility and safety for maintenance personnel.
3. Satisfy clear zone requirements as defined in the AASHTO Roadside Design Guide (current edition), Chapters 3 and 4.

**Delete Article 3.5 paragraph C and replace with the following:**

- C. Conform to minimum requirements of AASHTO M 314 for anchor bolts. Do not weld anchor bolts to reinforcing steel. Galvanize all nuts, washers and anchor bolts in accordance with AASHTO M 232.
- D. Install anchor bolts in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (current edition) Article 5.17.

END OF SECTION

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**SECTION 13552M**

**RAMP METER SIGNALS AND SIGNING**

**Delete Article 1.1 paragraph A and replace with the following:**

- A. Furnish and install conduit, junction boxes, signal heads, signing, mounting brackets, wire, grounding, and foundations. Install all state furnished items. Includes all materials, labor, workmanship, equipment, testing, documentation, and incidental items required to install and test a complete and operational Ramp Meter system as shown on the plans and details.

**Delete Article 1.3 and replace with the following:**

- A. AASHTO Standard Specifications for Highway Bridges
- B. AASHTO Standard Specifications for Highway Bridges: Division II - Construction, Section 5: Drilled Piles and Shafts
- C. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (current edition)
- D. American Iron and Steel Institute (AISI)
- E. American National Standards Institute (ANSI)
- F. Manual on Uniform Traffic Control Devices (MUTCD)
- G. National Electric Code (NEC)
- H. Underwriters Laboratories (UL)

**Delete Article 2.2 and replace with the following:**

**2.2 RAMP METER POLE MOUNT SIGNAL ASSEMBLY**

- A. 8-inch 1 section signal head with red LED Module for enforcement. No back plate required.
- B. For all signal heads: Refer to Section 02892. Louvered back plate required.
- C. Regulatory Sign: MUTCD R10-6; 24-inch x 36-inch.
- D. 24-inch x 18-inch 1 VEHICLE PER GREEN Sign: Refer to AT series Standard Drawings.
- E. All signal head housings: yellow with hoods.
- F. Signal Pole: Refer to Section 02892 and SL series Standard Drawings.
- G. Foundation Concrete: Class AA(AE) Concrete (Refer to Section 03055).
- H. Provide two “Z” bars on the back of the sign to support against thrown snow. Refer to SL Series Standard Drawings.

**Delete Article 2.3 and replace with the following:**

**2.3 RAMP METER MAST ARM SIGNAL ASSEMBLY**

- A. For 12-inch signal heads: Refer to Section 02892. Louvered back plate required.
- B. 60-inch x 36-inch 1 VEHICLE PER GREEN EACH LANE Sign: Refer to AT series Standard Drawings.
- C. All signal head housings: yellow with hoods.
- D. Signal Pole: Refer to SL series Standard Drawings.
- E. Reinforcing Steel: Coated steel (Refer to Section 03211).
- F. Concrete: Class AA(AE) Concrete (Refer to Section 03055).

**Delete Article 2.4 and replace with the following:**

**2.4 ADVANCE FLASHING BEACON SIGN**

- A. Two 8-inch signal heads with yellow LED Module: Refer to Section 02892. No back plate required.
- B. Warning Sign: WS3-3, 36-inch x 36-inch. Refer to AT Series Standard Drawings.
- C. 30-inch x 24-inch black on yellow METERING WHEN FLASHING Sign: Refer to AT series Standard Drawings.
- D. All signal head housings: yellow with hoods.
- E. Signal Pole: Refer to Section 02892 and SL series Standard Drawings.
- F. Foundation Concrete: Class AA(AE) Concrete (Refer to Section 03055).
- G. Provide two “Z” bars on the back of the sign to support against snow plow activity. Refer to SL Series Standard Drawings.

**Delete Article 2.5 and replace with the following:**

**2.5 BOLTS AND NUTS**

- A. Follow Section 02892.

**Delete Article 2.6 and replace with the following:**

**2.6 WIRE**

- A. Provide one 7-conductor signal cable to each signal head. Follow section 02892 for signal cable specifications.

**Add the following to Article 2.8:**

- C. Use 240-volt 400 watt luminaries if 480-volt power service is not available.

**Delete Article 3.2 and replace with the following:**

### **3.2 FOUNDATION**

- A. Conform to AASHTO's Standard Specifications for Highway Bridges for all material and workmanship.
- B. Prior to work, verify that the installation of the signal heads, mast arm, pole, and foundation in the location marked in the field has no conflict with existing utilities, underground and overhead. Comply with all utility and Blue Stakes requirements.
- C. See AT Series Standard Drawings for ramp meter signal assembly and advance flashing beacon assembly details and placement.
- D. Excavation: Refer to Section 13551.
- E. Construct caissons to conform to AASHTO Standard Specifications for Highway Bridges: Division II - Construction, Section 5: Drilled Piles and Shafts. Drill caissons into either native soil or compacted fill.
  - 1. If formwork is required during drilling, the forms may be withdrawn during concrete placement.
  - 2. Cast the top of the caisson against the formwork for appearance.
- F. Place concrete directly into the excavation. Use minimum forming.
- G. Do not weld reinforcing steel, conduit, or anchor bolts; tie reinforcing steel and conduit securely in place.
- H. Install Reinforcing Steel according to Section 03211.
- I. Use Class AA(AE) for all cast-in-place concrete. Cap all conduits before placing concrete.
- J. Install weep hole in foundation per SL series Standard drawings.

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**SECTION 13553M**

**ATMS CONDUIT**

**Delete Article 1.2 paragraphs I and J and replace with the following:**

- I. Section 13554: Polymer Concrete Junction Box

**Delete Article 1.3 and replace with the following:**

**1.3 REFERENCES**

- A. ASTM D 2241: Standard Specification for Poly-Vinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series)
- B. American National Standards Institutes (ANSI)
- C. American Wire Gauge (AWG)
- D. American National Standards Institutes (ANSI)
- E. International Municipal Signal Association (IMSA) Standards
- F. National Electric Code (NEC)
- G. National Electrical Manufacturers Association (NEMA)
- H. Railroad Specifications
- I. Underwriters Laboratory (UL)

**Delete Article 2.1 paragraph H and replace with the following:**

- H. Provide fiber optic and electrical buried cable marker warning tape that meets the following requirements:
  - 1. Material: Composite reinforced thermoplastic.
  - 2. Tape Color: Orange (communication) or Red (electric).
  - 3. Text: Caution Buried Communication Cable or Caution Buried Electric (front and back).

4. Maximum distance between text: 5 feet.
5. Text Color: Black.
6. Width: 3-inch minimum (face or diameter).

**Delete Article 2.1 paragraph I and replace with the following:**

- I. Provide 1 green insulated IMSA 51-3 #14 locator wire in 1-inch conduit in each trench where ATMS Conduit is installed. Place the locator wire conduit at the top of all other conduit in the trench as shown in AT series Standard Drawings. Install locator wire in existing non-multiduct conduit where new fiber optic cable is to be installed.

**Delete Article 3.1 paragraph F and replace with the following:**

- F. Install all conduit bends to have a radius that is not less than the following:
  1. 24 inches within the cabinet and pole foundations
  2. 36 inches in all other locations

**Delete Article 3.1 paragraph Q item 3 and replace with the following:**

3. Reduced maximum spacing if horizontal or vertical deflection prevents the installation of cable within maximum tensile rating of the cable or location wire.

**Delete Article 3.2 paragraph A and replace with the following:**

- A. Paved Surface (asphalt concrete):
  1. Install T-patch over trenched area according to AT Series Standard Drawings.
  2. Cut pavement from roadway to roadway base on both sides of trench to provide clean, straight wall for T-patch prior to any backhoe use per Section 02705.
  3. Refer to AT series Standard Drawings for depth of flowable fill under paved surfaces.
  4. Minimum soil compaction under pavement: 96 percent.
  5. Evenly apply tack coat before final backfill.
  6. Restoration patch: match the composition, density, and elevation (1/4 inch), of the existing surface per Section 02741.

**Delete Article 3.3 paragraph F and replace with the following:**

- F. Install manufactured sweeps (11 1/4, 22 1/2, 45, 90 degree angle) with conduit compatible bell and spigot ends. Do not field bend conduit.

**Add the following to Article 3.4:**

- C. Contain and remove all drilling fluid outside the bore immediately. Contractor's estimate will not be processed until all drilling fluid outside the bore has been removed and properly disposed of.

**Add the following to Article 3.5:**

- C. Use existing conduit only in-situ and as approved by the Engineer or shown on design plans. Use new conduit on all new installations.



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**SECTION 13554M**

**POLYMER CONCRETE JUNCTION BOX**

**Delete Article 2.2 and replace with the following:**

**2.2 JUNCTION BOXES AND LIDS**

- A. Provide junction boxes and vaults that resist water absorption in accordance with ASTM D 570.
- B. Select Junction Boxes for load rating as defined on AT series Standard Drawings as follows:
  - 1. Load Rating 1: Incidental Vehicular Traffic
    - a. In any paved area immediately adjacent to the mainline, such as shoulders, snow storage areas, or vehicle pullout areas, provide boxes, rings, and lids that sustain a minimum vertical test load of 33,500 lbs over a 10-inch x 20-inch square.
  - 2. Load Rating 2: Non-wheel Loading Accessible
    - a. In area not in traveled way, provide boxes, rings, and lids that sustain a minimum vertical test load of 22,500 lbs over a 10-inch x 20-inch square.
- C. Provide a poured-in-place 1-inch thick grout floor, with a 1-inch diameter drain, for all type I, II, and III-Polymer Concrete Junction Boxes or a box with a prefabricated floor with a 1-inch drain hole. Refer to ASTM C 579 and ASTM C 580 for test methods for grout.
- D. Provide lid for all junction boxes as specified by application.
- E. Provide lids with a non-skid surface with minimum coefficient of friction of 0.50, per ASTM C 1028. Coatings will not be approved.

- F. Manufacture lids with the following markings in the logo area, in 1-inch recessed letters:
  - 1. “Traffic Signal” when the junction box contains cables or wires for traffic signal (Refer to Section 02892), CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element (Refer to Section 13551).
  - 2. “Electric” when the junction box contains power conductors used for traffic signal, CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element.
  - 3. “Street Lighting” when the junction box contains street lighting conductors only. Inscribe “High Voltage” below the words “Street Lighting” when the junction box contains voltage above 600 V.
  - 4. “Communication” when the junction box contains multi-duct conduit for future use.
  - 5. “Sprinkler Control” when sprinkler control conduit enters the junction box.
- G. Provide lids with recessed access point to allow removal of cover with a hook or lever. Repair damage to the pulling point in the lid.
- H. Provide lids with vandal-resistant stainless steel recessed bolts.

**Delete Article 3.1 paragraph H through N and replace with the following:**

- H. Install bushings on end of all conduit prior to cable installation.
- I. Do not install conduit in corner of junction box or within 2 inches of corner of junction box. Extend conduit 2 inches beyond the inside wall of the junction box. Refer to AT series Standard Drawings.
- J. Enter conduit through the sides of the junction box and not from the bottom. Place the conduit at least three inches above the floor.
- K. Place the recessed access point in a location that provides both leverage and safety.
- L. Saw cut concrete or other improved surfaces that require removal in the sidewalk area. Remove entire section of sidewalk. Replace with in-kind materials to match the existing grade.
- M. Provide 12 inches deep free draining granular backfill borrow (Refer to Section 02061) directly under junction box.

- N. Install Engineer approved expansion joint material around entire periphery of ring for junction boxes installed in paved surface.

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**SECTION 13555M**

**ATMS CABINET**

**Add Article 1.3 paragraph E:**

- E. National Electric Code (NEC)

**Delete Article 2.1 paragraph A and replace with the following:**

- A. Concrete: AA(AE) required. Refer to Section 03055.

**Delete Article 3.1 paragraph D**

**Delete Article 3.2 paragraph C. and replace with the following:**

- C. Concrete: AA(AE) required. Refer to Section 03055.

**Delete Article 3.2 paragraph G and replace with the following:**

- G. Extend conduit 2 inches above the floor of the cabinet foundation.

**Delete Article 3.2 paragraph H and replace with the following:**

- H. Conduit
  - 1. Install all conduit in base of cabinet in a 12-inch x 18-inch rectangle centered in the cabinet base.
  - 2. Refer to the Project Plans for the number, size, and orientation of all conduits entering the junction boxes.
  - 3. Refer to AT series Standard Drawings for number and type of conduit used between the cabinet and adjacent junction boxes.
  - 4. Above ground, use galvanized rigid steel; underground, use PVC.
  - 5. Install bushings on the ends of all conduit prior to cable installation.
  - 6. Provide 1 inch minimum spacing between each conduit in cabinet base. Cap conduit at both ends until used.

**Delete Article 3.4 and replace with the following:**

- A. Unless specified on the plans, install either a supplemental disconnect as described on AT series Standard Drawings, or an approved underground service pedestal as described in the SL series Standard Drawings and in Section 13561.
- B. Install disconnect or underground service pedestal between 10 and 15 feet from the cabinet, away from roadway. Field locate with the Engineer. Install the unit such that the door is downstream of traffic flow.
- C. Ground disconnect on ground rod located in Type I junction box at the cabinet base.
- D. Ground the transformer to the control cabinet ground terminal.
- E. Install disconnect and transformer in accordance with AT Series Standard Drawings, SL Series Standard Drawings, and the NEC.

**Delete Article 3.6 paragraphs A and B and replace with the following:**

- A. Refer to section 13561 for Power Service.

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**SECTION 13556**

**CLOSED CIRCUIT TELEVISION (CCTV) ASSEMBLY**

**Delete Section 13556 and replace with the following:**

**PART 1      GENERAL**

**1.1      SECTION INCLUDES**

- A.      All materials, labor, workmanship, equipment, testing, documentation, and incidental items required to install and test a complete and operational Freeway CCTV system as shown on plans and details.
- B.      State furnished CCTV pole with foundation and anchor bolts, furnish and install junction box at the base of the pole with ground rods, ground wire, and all other incidental hardware. Includes Contractor furnished CCTV Cable, and all other conduit and junction boxes required to provide a path from the CCTV pole to the control cabinet.
- C.      Furnish and install wood CCTV pole.
- D.      State furnished freeway CCTV assembly with pan/tilt unit, camera control receiver, and pole-mounted cabinet.

**1.2      RELATED SECTIONS**

- A.      Section 03055: Portland Cement Concrete
- B.      Section 03211: Reinforcing Steel and Welded Wire
- C.      Section 03310: Structural Concrete
- D.      Section 13551: General ATMS Requirements
- E.      Section 13553: ATMS Conduit
- F.      Section 13554: Polymer Concrete Junction Box
- G.      Section 13555: ATMS Cabinet

H. Section 13595: ATMS Integration

### **1.3 REFERENCES**

- A. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals
- B. AASHTO Standard Specifications for Highway Bridges: Division II - Construction, Section 5: Drilled Piles and Shafts
- C. AASHTO Standard Specifications for Highway Bridges
- D. American Wire Gauge (AWG)
- E. Electronic Industries Association (EIA) Standards
- F. International Municipal Signal Association (IMSA) Specifications
- F. National Electric Code (NEC)
- G. Underwriters Laboratory (UL)

### **1.4 SUBMITTALS**

- A. Provide all of the following submittals as described in Section 13551:
  - 1. Contractor Furnished Material and Equipment Lists
  - 2. Test Reports for the Cable & Conductor Test, the Local Field Operations Test, and the Thirty-Day Burn-In Test
  - 3. Completion Notice
  - 4. Manufacturer's Equipment Documentation
  - 5. As-Built Drawings

## **PART 2 PRODUCTS**

### **2.1 CCTV POLE OR LUMINAIRE**

- A. Wood Pole Mounted CCTV: provide class 5 or 6 Douglas Fir wood pole, treated with Chromated Copper Arsenate CCA Type C, 33 ft nominal length and not less than 5½ inches diameter at top.
- B. Steel Pole Mounted CCTV: steel pole with anchor bolts provided by the Department.

## **2.2 CCTV STEEL POLE FOUNDATION**

- A. Class AA(AE) concrete. See Section 03055 and Section 03310.
- B. Reinforcing Steel: Coated steel (Refer to Section 03211).
- C. Non-Shrink Grout

## **2.3 JUNCTION BOX**

- A. Refer to Section 13554.

## **2.4 CCTV ASSEMBLY**

- A. Department furnished:
  - 1. Camera assembly, including camera, pan/tilt unit, control receiver, environmental enclosure, and cabling.

## **2.5 MOUNTING EQUIPMENT**

- A. Provide clamp kit, mounting hardware, pipe, shims, grommet, and all additional equipment to attach CCTV assembly to pole or mast arm.
- B. Provide all stainless steel or hot-dipped galvanized fasteners and hardware unless otherwise approved. Provide copper pole grounding lug.

## **2.6 DATA SURGE SUPPRESSOR**

- A. Surge suppression: State furnished IPS-RDPE Unit.

## **2.7 CCTV CABLE**

- A. Provide type composite CCTV cable to meet or exceed the following requirements:
  - 1. Outer Jacket
    - a. Type 4E
    - b. Type CMG CMR C
    - c. UL listed
    - d. JKT Riser



2. Data
  - a. 2 stranded conductors
  - b. 18 AWG
  - c. 0.10 inch PVC jacket thickness
3. Power
  - a. 3 stranded conductors
  - b. 12 AWG
  - c. 0.12 inch PVC jacket thickness
4. Video
  - a. 1-RG59 coaxial cable
  - b. 95 percent Braid Coverage
  - c. O/A 0.03 inch PVC

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Load, transport, and install all state-furnished materials per the manufacturer's instructions and as shown in the plans.
- B. Provide foundation, junction boxes, ground rod, grounding lug, conduit, stainless steel mounting bands, wood pole, and all additional equipment required for a complete and operational CCTV system.
- C. Install all wiring, conduit, and junction boxes as shown on site plans and details.
  1. Field locate all conduits per Section 13553 and junction boxes to avoid drainage areas and steep slopes whenever possible.
  2. Protect existing conductors while installing camera cables and conductors.
- D. Connect the controller and all wires as specified by the manufacturer.
- E. Furnish and install all incidental items, such as wire nuts, grommets, tape connectors, and electrical nuts, necessary to make the CCTV system complete.
- F. After installation, the exterior of all equipment must be free of all loose rust and mill scale, dirt, oil, grease and other foreign substances.

### **3.2 STEEL CCTV POLE FOUNDATION**

- A. All material and workmanship conforms to AASHTO Standard Specifications for Highway Bridges.
- B. Verify that the installation of the CCTV camera, pole, pole mount cabinet, junction boxes, and foundation in the location marked in the field has no conflict with existing utilities, underground and overhead. Comply with all utility and blue stake requirements.
- C. Excavation
  - 1. Refer to Section 13551.
- D. Construct Caissons to conform to AASHTO Standard Specifications for Highway Bridges: Division II - Construction, Section 5: Drilled Piles and Shafts. Drill caissons into either native soil or compacted fill.
  - 1. If formwork is required during drilling, the forms may be withdrawn during concrete placement.
  - 2. Cast the top of the caisson against the formwork for appearance.
- E. Place concrete directly into the excavation. Use minimum forming.
- F. Do not weld reinforcing steel, conduit, or anchor bolts; tie reinforcing steel and conduit securely in place.
- G. Install Reinforcing Steel according to Section 03211.
- H. All cast-in-place concrete will be class AA(AE) except where specified otherwise. Cap all conduits before placing concrete.
- I. After pole is installed, place non-shrink grout between base plate and foundation surface.
- J. Install weep hole in foundation per SL series Standard Drawings.

### **3.3 ANCHOR BOLTS**

- A. Install anchor bolts in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (current edition) Article 5.17: Anchor Bolts.

### **3.4 STEEL CCTV POLE**

- A. Install the metal camera poles on concrete bases as described herein. Refer to AASHTO Standard Specifications for Structural Supports for Highway Bridges, as well as AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals section 5.18.
- B. Install pole such that the hand hole is facing away from traffic.
- C. Install ground rod. NEC 250.1.
- D. All fasteners and attachment hardware for bands and other equipment: stainless steel.
- E. Furnish and install all incidental items, such as wire nuts, grommets, tape connectors, electrical nuts, etc., necessary to make the CCTV system complete.
- F. Adjusting the anchor bolt nuts, plumb all steel poles to the vertical with all camera equipment installed.
- G. Pole Mount Cabinet
  - 1. The Department rejects poles that are damaged by improper drilling of holes.
  - 2. Drill and nipple holes at each site.
  - 3. Touch-up by hot stick method.

### **3.5 WOOD CCTV POLE**

- A. Install wood pole below grade to a minimum depth equal to one-sixth the total pole height. Refer to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.
- B. Increase the installation depth by one times the diameter of the pole when wood pole is installed on a slope of 2:1 or greater. Measure depth from the down-slope side of the pole.
- C. Backfill with native material in 1 foot lifts to match surrounding grade. Tamp each lift to 90 percent compaction.

### **3.6 CCTV ASSEMBLY**

- A. Assemble the camera assembly and prepare for installation per the manufacturer's instructions prior to delivery to the job site.

- B. Deliver the assemblies to the job site as complete units, and install as per the plan details.

### **3.7 CCTV CABLES**

- A. Install camera cables in conduit and poles. All cable runs must be continuous and must run without splices between the camera and the cabinet.
- B. Keep cable ends sealed at all times during installation using an approved cable end cap. Keep cable end sealed until connectors are installed.
- C. Do not violate the minimum bending radius and the maximum pulling tension recommended by the manufacturer's specifications at any time.
- D. Provide 6 ft of cable slack in all cabinets. Refer to Section 13555.
- E. Make all camera cable connections between the CCTV assembly, RS-422/RS-232 converter, and communications equipment, as required to provide a fully operational CCTV system.

### **3.8 CONDUCTORS**

- A. Dome CCTV: furnish and install 3-#12 stranded IMSA Spec 20-1 power conductor cables between the 24 VAC transformer in the cabinet and the cabinet assembly on the luminaire arm.
- B. Freeway CCTV: furnish and install 3-#6 from camera assembly to cabinet.
- C. Freeway CCTV with Pole Mounted Cabinet: furnish and install 3-#12 from camera assembly to cabinet.
- D. Splices: not allowed between camera and cabinet.

### **3.9 POLE-MOUNTED CABINET**

- A. Install cabinet such that cables enter the underside of the cabinet.
- B. Arrange all equipment installed in the cabinet in a neat and orderly fashion on shelf. Refer to Section 13555.
- C. Install pole mounted cabinet such that it faces away from traffic. Use stainless steel bands.

### **3.10 JUNCTION BOX**

- A. Refer to Section 13554.

### **3.11 TESTING AND ACCEPTANCE**

- A. Successfully complete the following tests:
  - 1. Cable and Conductor Test: Refer to Section 13551.
  - 2. Local Field Operations Test: Use the Closed Circuit Television (CCTV) Local Field Operations Test form Instruction. Obtain UDOT's newest version of the form from the UDOT Web site. Refer to <http://www.udot.utah.gov/index.php/m=c/tid=719>.
    - a. Conduct the test after the Cable and Conductor test has been successfully completed and the Cable and Conductor Test Report has been approved by the Engineer.
    - b. Furnish all equipment, material, and labor necessary for the test.
  - 3. Acceptance Tests: Refer to Section 13595.

END OF SECTION

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**SECTION 13561M**

**ATMS POWER SERVICE**

**Add the following to Article 2.1:**

- K. Use copper conductor with RHH-USE-RHW rated insulation for all underground and riser electrical conductors.

**Delete Articles 3.1 paragraphs E through G and replace with the following:**

- E. Ground all electrical equipment, including cabinets in accordance with the NEC requirements. Hard draw all ground wires.
- F. Supply all conduit and conductors to power source connection location. Final connection is to be made by the power company.

**Delete Article 3.2 paragraph A and replace with the following:**

- A. Contact the Engineer a minimum of 6 weeks prior to power service hookup.

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**SECTION 13594M**

**FIBER OPTIC COMMUNICATION**

**Delete Article 2.3 paragraph A and replace with the following:**

- A. With the following characteristics and as specified on the plans:
  - 1. LC (standard)
    - a. Factory installed or field installed LC or LC compatible connectors.
    - b. Ceramic ferrules.
    - c. Maximum insertion loss: 0.30 dB.
    - d. Connector back reflection: greater than 35 dB.
  - 2. ST (to be used only where approved)
    - a. Factory installed or field installed ST or ST compatible connectors.
    - b. Ceramic ferrules and metallic connector bodies.
    - c. Maximum insertion loss: 0.30 dB.
    - d. Connector back reflection: greater than 35 dB.

**Delete Article 2.3 paragraph C and replace with the following:**

- C. Furnish and install new fan-out kits to replace any existing fan-out kits that must be severed in order to make fiber terminations.

**Delete Article 2.4 and replace with the following:**

- A. Provide splice enclosures with the following minimum characteristics:
  - 1. Comply with Telcordia GR-771
  - 2. Corrosion resistant shell
  - 3. Allow re-entry without replacing the cable seals
  - 4. One 3-section end plate with 6 pre-molded cable entry ports
  - 5. One blank end plate
  - 6. Hinged splice trays to provide easy access to splices on other trays
  - 7. Strength member tie-off
  - 8. Mechanism to resist cable pull-out
  - 9. All required accessories to complete the splice

- B. Type A:
  - 1. Accommodates up to 288 splices
  - 2. Contains 2 or more 36-count splice trays
- C. Type B: For locations with up to 48 splices.
  - 1. Accommodates up to 48 splices
  - 2. Contains 2 or more 12-count splice trays